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Towards a Framework for Analyzing and Evaluating Servitization Potential: Case Study of ENVIE Loire

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Abstract. For a manufacturing company, moving from selling a product to selling a function is a process called "servitization", leading to the suggestion of an offer oriented functionality that is more commonly called a Product-Service System (PSS). This process requires for a company to have a relatively clear vision of possible scenarios. Under the ServINNOV¹ project, we proposed after a deep analysis of the main researches on PSS a new approach to analyze the servitization potential. In this paper, we present our conceptual framework for identifying and evaluating the different scenarios and we illustrate the practical use of this approach using the case study of ENVIE Loire which develops remanufacturing activities.

Keywords: Servitization, Product-Service System; function-oriented business model; Tangible Value; Intangible Value; Envie Loire.

1. Introduction

In these previous years, the principles of service integration for manufacturing companies, and product integration for companies of the tertiary sector, respectively called "servitization" and "productisation", are research themes or entrepreneurial initiatives that are increasingly being encountered.

Providing a client with functionality is not only based on a product, but also on a service package in order to present the client with functionality and insure its proper running. Products and services are two concepts that are both related in the same functionality offer, commonly called a Product-Service System (PSS).

¹ ServINNOV is a national funded research project, placed under the leadership of Henri Fayol Institute. With financing from the French National Research Agency-ANR and on collaboration with three research laboratories: COACTIS, G-SCOP, and PACTE. The project aims at studying one of the current changeovers of industrial companies from a production and innovation process essentially based on material goods to the integration of multiple service activities. <http://copas.emse.fr/servinnov/>

The well-known examples of service economy business models are those of large companies: Michelin, Xerox, Rolls-Royce, ... In order to successfully shift towards this new business model, many SMEs have to face up to two major questions:

1. The identification of the possible product-service offer, which product(s) and which related service(s) ?
2. The analysis of the profits and costs related to these different scenarios of servitization?

This is the context of our paper, in which we try to give clear answers to these questions by proposing a new approach to analyze the potential of servitization. In this paper, we present our framework and we illustrate the practical use of this approach using the case study of ENVIE, a company that delivers remanufacturing activities.

2. Service Economy and Servitization

Below, we briefly recall what we call service economy and servitization.

2.1. Service economy: The first use of the term service economy was attributed to the architect and town planner Walter Stahel, and to the economist Orio Giarini, in 1986. They define it as goods or services optimization that consequently improve wealth management — goods, knowledge, nature [1]. The objective of service economy is not only to create, as large as possible, use value, but to ensure at the same time a sound consumption of raw materials and energy resources. The value of a product isn't just related to its physical components, but also and mainly related to its intangible elements that can improve the product's performance and can be a source to create value. If literature surrounding service economy isn't yet quite developed, a large theoretical field regarding Product-Service System (PSS) has emerged and developed since the fundamental work of Mont [2]. In fact, service economy can be considered as a particular model of a PSS offer.

2.2. Servitization: Product-service systems are defined as a “marketable set of products and services, jointly capable of fulfilling a client's need. The product/service ratio can vary, either in terms of function fulfillment or economic value” [3]. The development of servitization is relatively large, especially in industrial strategy. We will not go back to this set of work (a literature revue was done by Baines *et al.* [4], but we will focus particularly on developments that provide a pertinent base to identify servitization scenarios and their economic analysis.

2.3. Types of Product-Service Systems-PSS: Multiples classifications of PSS have been proposed. The most common classifies them into three types [5]:

1. Product oriented PSS: provide an additional service to the sold product (funding, maintenance, recovery at the end, training, etc.);
2. Use oriented PSS: the use of the product is sold, not the product itself (renting, leasing, pooling and sharing);

3. Result oriented PSS: the producer ensures the satisfaction of the consumer's needs, regardless of material products (low cost planning, installation management services).

As it can be seen in figure 1, Tukker [6] goes further and identifies 8 subcategories of PSS:

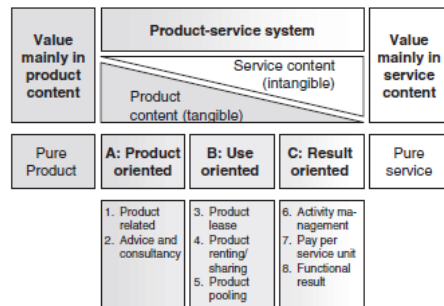


Figure 1. Categories and subcategories of PSS ([6], p. 248)

Each of these categories groups models that present more differences on the economic scale than on the environmental one. We will focus here on the economic aspects, especially from the value creating perspective.

2.4. Elements of value creation by PSS: Tukker [6] proposes four “key economic elements” that allow the analysis and the benchmarking of the added value of the different types of PSS. These elements are presented below:

1. **Market value of PSS:** it can be tangible and/or intangible: the tangible value of PSS refers to the objective value it brings to the consumer (Resource, time and capital economy). The intangible value is subjective and therefore harder to estimate. It can consist of profits in terms of images, response to standards, etc.
2. **Production costs of PSS:** they include, of course, the traditional production costs, and take into consideration as well, when it comes to result oriented PSS, their inherent uncertainty. In fact, the PSS supplier in this case who engages on a result can run into penalties if the promised results are not met.
3. **The investments related to the production of PSS:** They not only cover at the same time the necessary capital needed for the production of PSS, but also the set of investments related to the company's transition and the modification of its organization.
4. **The capacity to capture value within the value chain:** today as well as in the future. This “capture” can be done for example by customer loyalty, or a rapid pace of innovation.

Based on these elements, we will present hereinafter our method that covers the set of PSS procedures and goes from the definition/creation of the need to its implementation.

3. Framework for Analyzing and Evaluating Servitization Potential

Based on the work of [7, 8 and 9], it was possible to obtain a holistic vision about some existent methodologies and to verify that a completed and globally accepted methodology does not exist. Thus, this research was guided with the aim to propose a new methodology for product-service systems. Under the project ServINNOV, and based on the analysis of previous literature, we proposed an analysis method for the potential of servitization (Figure 2). This global method consists of evaluating the difficulties and the opportunities that a company can encounter when developing a PSS system.

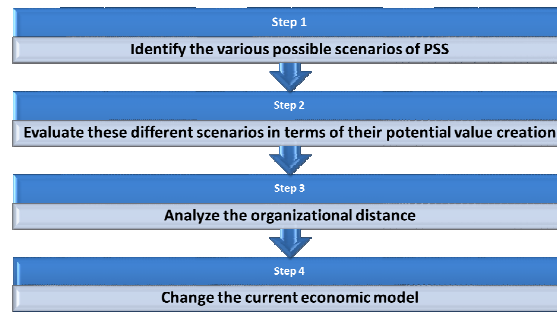


Figure 2: framework for analysis the potential of Servicisation

1. Identify the various possible scenarios of PSS: In fact, the first point of this method is to develop a portfolio of pertinent PSS scenarios, such as a large range of product-service systems that can be integrated in the company.

2. Evaluate these scenarios in terms of potential value creation: In this second step, the scenarios are evaluated based on certain indicators highlighted by Arnold Tukker [6] in his methodology: the tangible and intangible value for the consumer, risk provision.

3. Analyze the organizational distance between the current organization and the organization necessary for the provision of PSS: This third point is the analysis of the organizational distance of the company. To be able to shift towards this PSS portfolio, it is important to evaluate the feasibility of the scenarios. Baines and Lightfoot [10] explain that servitization is enabled by six elements: a strong leadership, informed and engaged customers, a platform for advanced services and benefiting people with humanistic skills-sets, readiness to exploit technology, a relationship-based strategic supply partnership. Based on these elements, we define organizational distance as the gap between the internal resources of a company and those necessary to its operation if its activity is modified.

4. Change the current economic model: Baines and Lightfoot [10] differentiate between the advanced services model and the base services and intermediate services model. For this one, in some instances this is quite straightforward such as when spare parts are paid for by customers at the point of collection, or when repairs are made on the basis of time and materials consumed and interim payments are made by the

customer”. (p. 74). The advanced services model can implicate a third partner: a financial partner who provides lump payment to the manufacturer and receives periodic payment for assets from customer. This is why we think that changing an economic model towards more services implies that the company must master its services offers even if it is not in the heart of its business.

In order to show the practical use of this method, we decided to use it on the case of Envie Loire. We willingly chose in this article to restrict the study of PSS to product and use oriented ones, even if the result oriented are the ones mostly used, but they are also more complex to develop.

4. ENVIE Loire and Servitization: Applying the Method

ENVIE Loire is a company that produces goods and services and positions itself in the competitive sale/maintenance sector of appliances. Even if its objective remains social, ENVIE is an insertion company through economic activity: the search for economic equilibrium is vital to pursue its social ambitions. However, in recent years, ENVIE’s economic model was heavily challenged, especially with the emergence of hard-discounters in the appliances sector, and its financial results are in decline. In this context, the development of services and servitization appeared to ENVIE’s managers as a potential field of diversification and development of its activity that is currently limited to sales of 4 large types of products: washing (washing machines, dishwashers), cold (fridges and freezers), cooking (ovens and stoves) and TV/PC.

4.1 Identify the various possible scenarios of PSS

A deep analysis study conducted on the possible services for this company offered the director real elements to build upon. Therefore, in the end of 2012, the following scenarios were proposed to the director: (Table1).

Table 1. Possible service scenarios

			Washing	Cold	Cookng	TV / PC
Product-oriented services	Product-related service	S1 <i>Maintenance contract</i>	✓	✓	✓	!
		S2 <i>Material Recovery at the end of its life cycle</i>	✓	✓	✓	✓
	Advice and consultancy	S3 <i>Improving the manuals</i>	✓	✓	✓	✓
Use-oriented services	Product lease	S4 <i>Offer to lease with formulas more or less long term</i>	✓	✓	✓	✓
	Product renting or sharing	S5 <i>Made available materials in partnership with various organizations</i>	✓	✗	✗	✗
	Product pooling	S6 <i>Using the materials simultaneously by users</i>	✓	✗	✗	✗

✓ : Seems feasible

! : Seems complicated

✗ : Seems infeasible

Table 1 shows a first analysis of the feasibility of these different scenarios according to the four categories of products. After the identification of these

possible/realizable scenarios, we only focus in this paper on two scenarios: S1 and S4 that only concern the activity of washing.

Scenario 1 “The sale of a maintenance service for professional appliances”: It is mainly a contract between Envie and a professional client — professional establishments, student residences, etc. In this type of contract, we were able to identify many adjustable parameters (the duration of the contract, the number of repairs, the number and type of preventive maintenance).

Scenario 4 “The sale of a renting service for washing machines”: the studied scenario is the renting of washing machines produced by Envie. Currently, the machines produced by Envie are sold to households, but for this new activity, the targeted clients are either professionals such as hairdressers, or households who are interested in this type of offer.

It is considered as a first approach towards the integration of services at Envie, this procedure of servitization takes time to implement and must be carried out incrementally in order for it to properly function. Maintenance (S1) and renting (S4) can also be used as a reference for a potential development of other scenarios.

4.2.2 Evaluating the different scenarios regarding potential value creation

The table below summarizes the evaluation of the two chosen scenarios based on their value creation for the client (tangible and intangible), the cost for the company and the obstacles for ENVIE.

Table 2: Analysis and comparison of the two scenarios

		Scenario 1 : Maintenance	Scenario 4 : Renting
Value for the user	tangible	Increase the lifecycle of the product by replacing certain parts.	. Absence of financial costs for acquiring the device, . Pre-diagnostic telephone call and rapid intervention in case of breakdown, Repair and change of broken device . Recovery of product at the end of the contract
	intangible	None	Use of equipment without owning it or paying for its maintenance (client serenity when facing the unexpected)
Costs for the company	Tangible costs for the supplier	. Cost of movement of technicians (salaries, fuel, amortization and vehicle repairs) . Cost of establishing a follow up system of client interventions	. Eventual replacement (cost for purchase and stock), . Movement for installation, diagnostic, repairs, recovery, . Follow up of customer files and making appointments, availability of technicians in case of breakdown, Establishment of payment system and invoice management
	Risk provision	None	. Managing the consequences of a deterioration (voluntary or misuse) of the equipment, . Risk of client non payment
Obstacles	For Envie	. Expertise regarding spare parts: which ones? Brands? . The intervention on parts is possible at home? Delays?	. Qualitative and quantitative procurement in material . Communication methods to advertise the renting offer . In case of problem, availability and reactivity of after sales services over the phone.

4.2.3 Analysis of the organizational distance between the current organization and the organization's structure necessary to deliver PSS

So, new process should be considered. The study conducted has led us to draw a map of the existing processes and the new ones that the company should develop:

1. **The prospecting process:** This is an administrative process, a research of clients for the service activity.
2. **Contract's progress:** Once the contract is signed, the payment process is launched, it depends on the fixed clauses during contract talks.
3. **Quality process:** The processes of the service activity are linked to performance indicators that are updated when implementing the activities.
4. **Procurement of parts process:** The parts are generally sent by the supplier to the shop within a period of 48h.

4.2.4 Shifting the current economic model

A calculation tool was developed to test the different scenarios along with three subscenarios (optimistic, realistic and pessimistic). We sum up hereinafter, a part of the performed analysis on the scenario S1 (maintenance) with optimistic assumptions:

1. The fact that the number of contracts increases linearly by adding a contract each 3 months (15 contracts in March 2019).
2. Recruiting a technician is confirmed during haltime to support the shift towards 4 contracts at the same time starting July 2015.

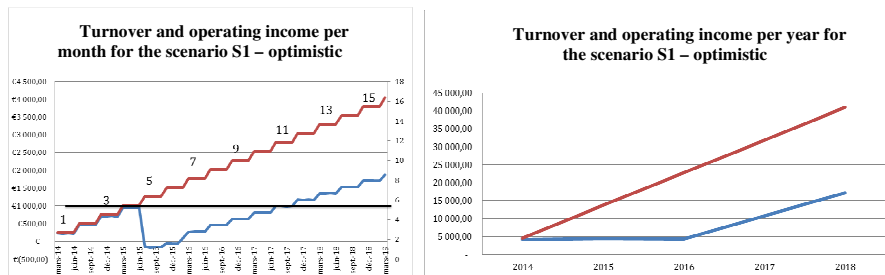


Figure 3: Turnover and operating income for the scenario S1 – optimistic

With these graphs, we can see that the scenario is profitable because it generates a positive result during all the years of the considered period. Other scenarios were tested and analyzed and the main results are summarized in the conclusion.

5. Conclusion

Through this paper, we proposed an approach to analyze the potential of servitization which consists of identifying the different possible scenarios of PSS, evaluating these

different scenarios based on their potential in term of value creation; analyzing the organizational distance and the strategic alignment of the company; and finally, changing the current economic model based on gaps identified in the previous step. We demonstrated its practical use on the case of Envie Loire. We then tested the other scenarios with the manager, this analysis showed various results:

- The difficulty for a small company to project itself in establishing services with steady means. The available means to create new services limits the number of potential clients (4 contracts at the same time)
- The development of associated services will quickly require the recruitment of a person dedicated to this activity, but this can really form a difficulty for a small company.
- Therefore, the scenarios position the services as 3% of the company's turnover, which is very little. These calculations were done based on a particular logic: take minimal risks, provide services with the existing resources with the potential of investing in additional means.

The company Envie henceforth has all the theoretical elements to know the impact of services on its organization but the development of these services can't be done without the will of the company's chief to take risks and without possibility of threatening the other activities of the company. This will require a real commercial development of services for new clients and the possibility to liberate time for the technicians to insure these services.

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